

**SILVER SENSITIZED ERBIUM ION DOPED PLANAR  
WAVEGUIDE AMPLIFIER**

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**ABSTRACT**

A material for use in optical amplifiers is described. The material includes an oxide glass substrate material, a rare earth dopant and a silver dopant. The silver dopant enhances photoluminescence of the rare earth dopants in the oxide glass. The silver can be introduced into the glass using an ion exchange process or by ion implantation. Oxide glass doped with erbium ions and silver ions provides a broad excitation band for photoluminescence of  $\text{Er}^{3+}$  in the visible and near ultraviolet. An amplifier material according to the present invention can be formed by ion implanting a rare earth ion, for example erbium, and doping with silver by an ion exchange method. Alternatively, the silver can be implanted into the material as well. The resulting silver dopant may be dispersed throughout the oxide glass primarily as ions as a result of the fabrication method.